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(56) Documents cited
GB A 2114346   GB 1452361   GB 1184813
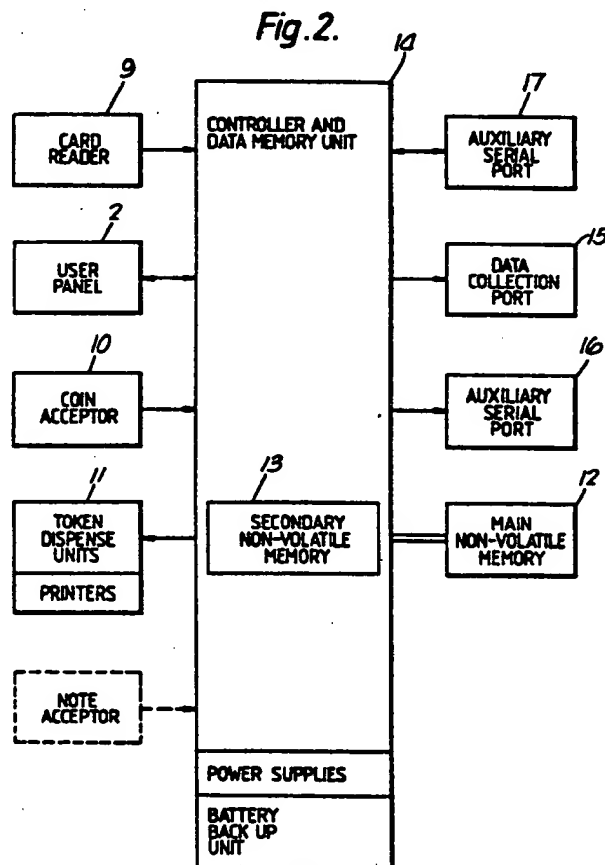GB A 2098775   GB 1371062

(58) Field of search
G4T
G4V
Selected US specifications from IPC sub-classes G07B
G07F

(54) **Sheet dispenser**

(57) A sheet dispenser for dispensing sheets carrying information to enable a commodity to be dispensed is described. The dispenser comprises a coin acceptor 10 for receiving a quantity of coins from an operator and for generating a signal representing the quantity of money deposited. A control system 11, 14 is provided which is responsive to information on an identification card and to the signal from the coin acceptor 10 to cause one or more tokens to be dispensed, each token carrying information relating to the quantity of money received. Two stores 12, 13 are provided for recording the same transaction information, the stores being separably accessible by a microprocessor whereby the stored information may be read by the microprocessor.

Fig.2.

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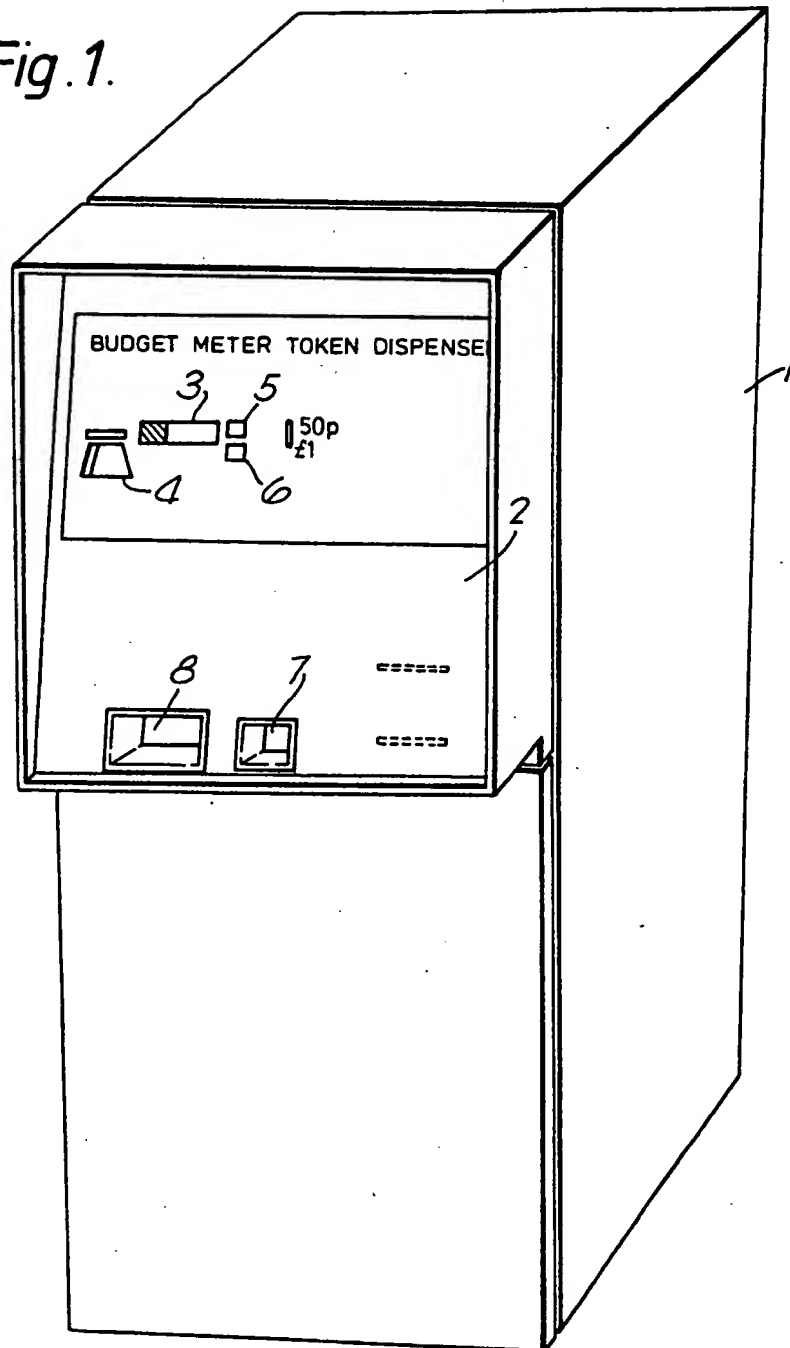
The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

Fig.1.

BUDGET METER TOKEN DISPENSE

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Fig.2.

CARD READER	CONTROLLER AND DATA MEMORY UNIT	AUXILIARY SERIAL PORT
USER PANEL		DATA COLLECTION PORT
COIN ACCEPTOR		AUXILIARY SERIAL PORT
TOKEN DISPENSE UNITS / PRINTERS	SECONDARY NON-VOLATILE MEMORY	MAIN NON-VOLATILE MEMORY
NOTE ACCEPTOR	POWER SUPPLIES / BATTERY BACK UP UNIT	

Fig. 3a.

INSERT CARD

CARD OK ? — N → TAKE CARD → END

Y

INSERT COINS

COINS OK ? — N → REJECT COINS

CANCEL ? — Y → TAKE CARD → REJECT COINS → END
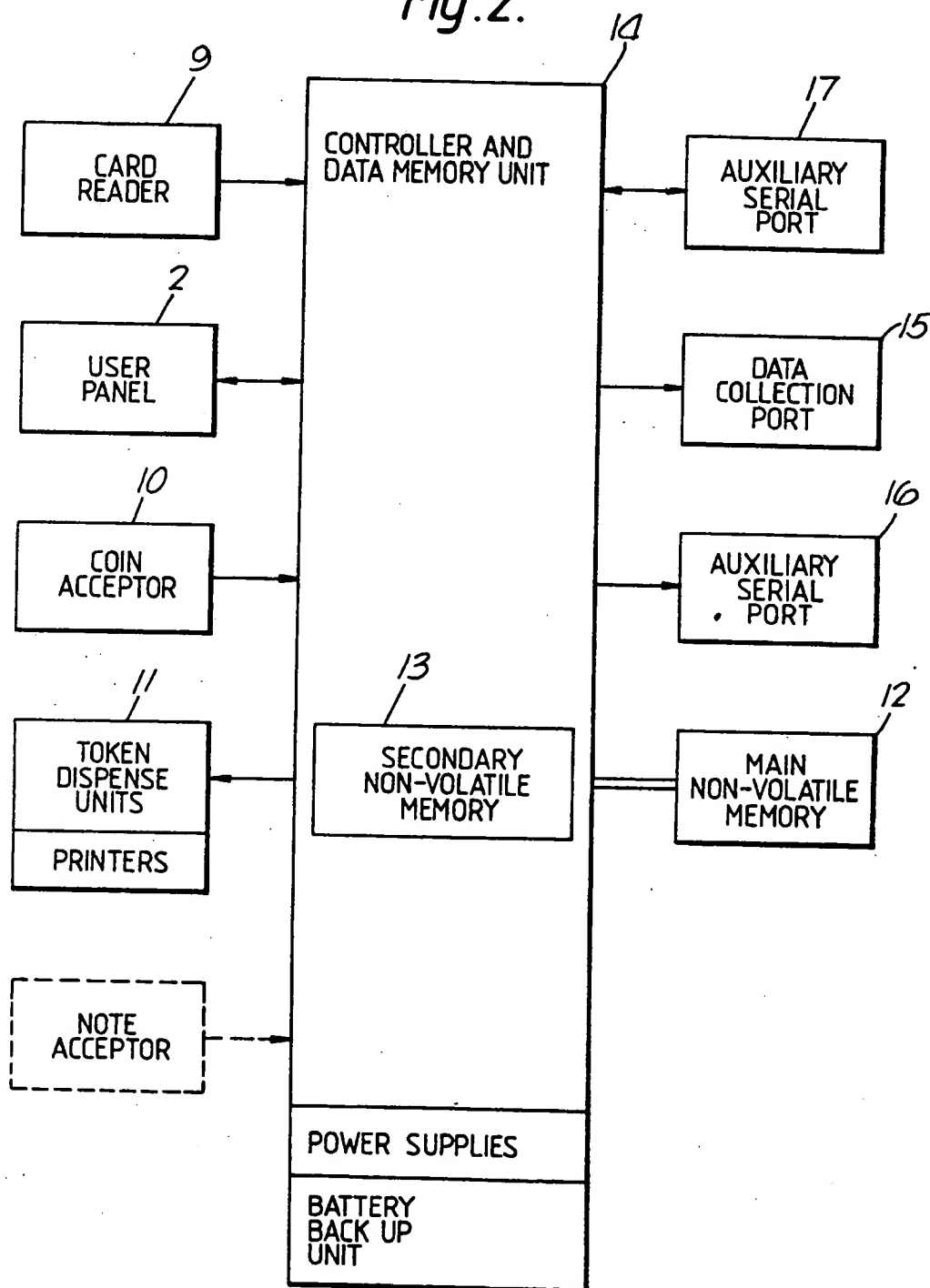
N

TOKENS ? — N

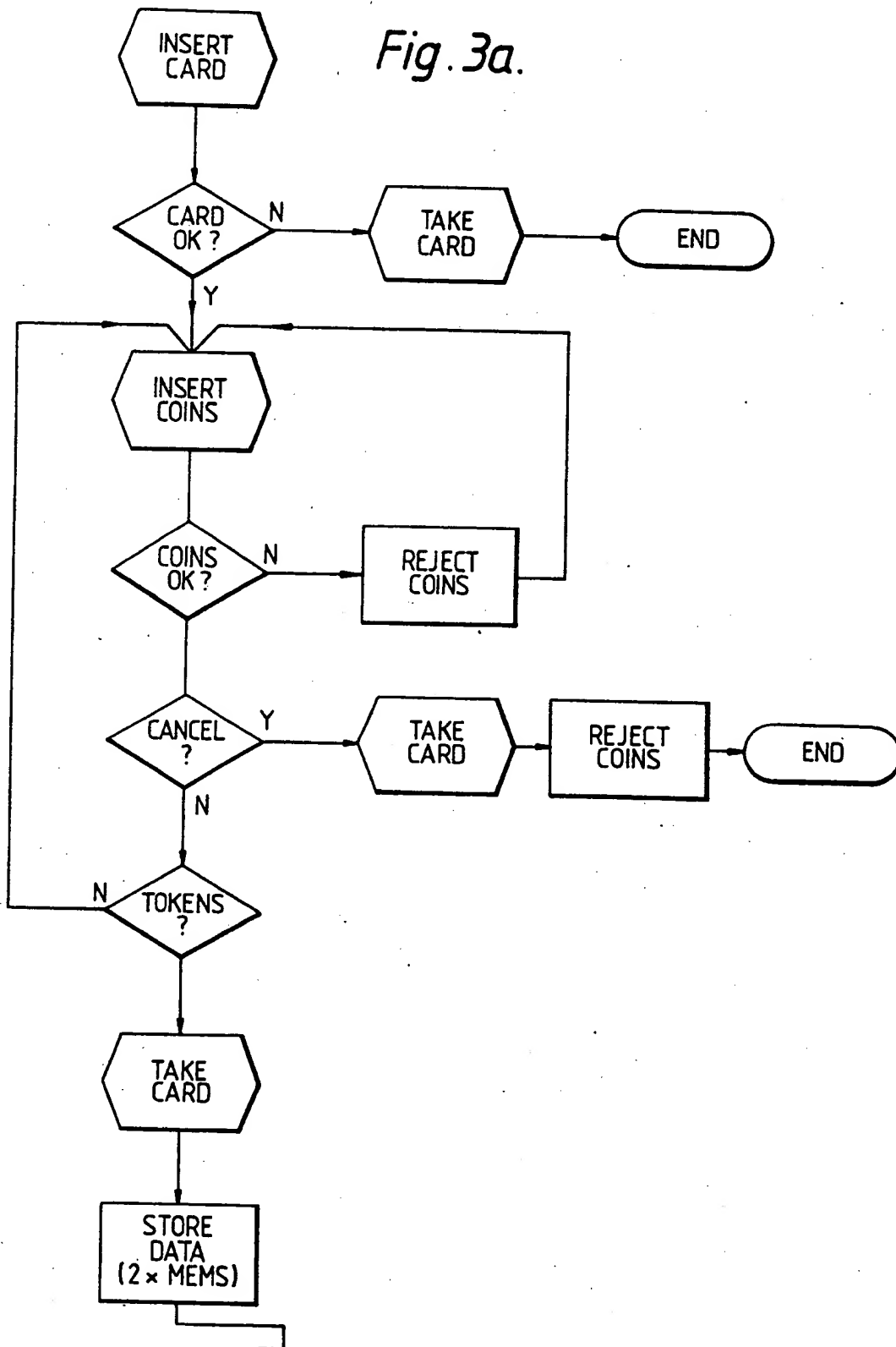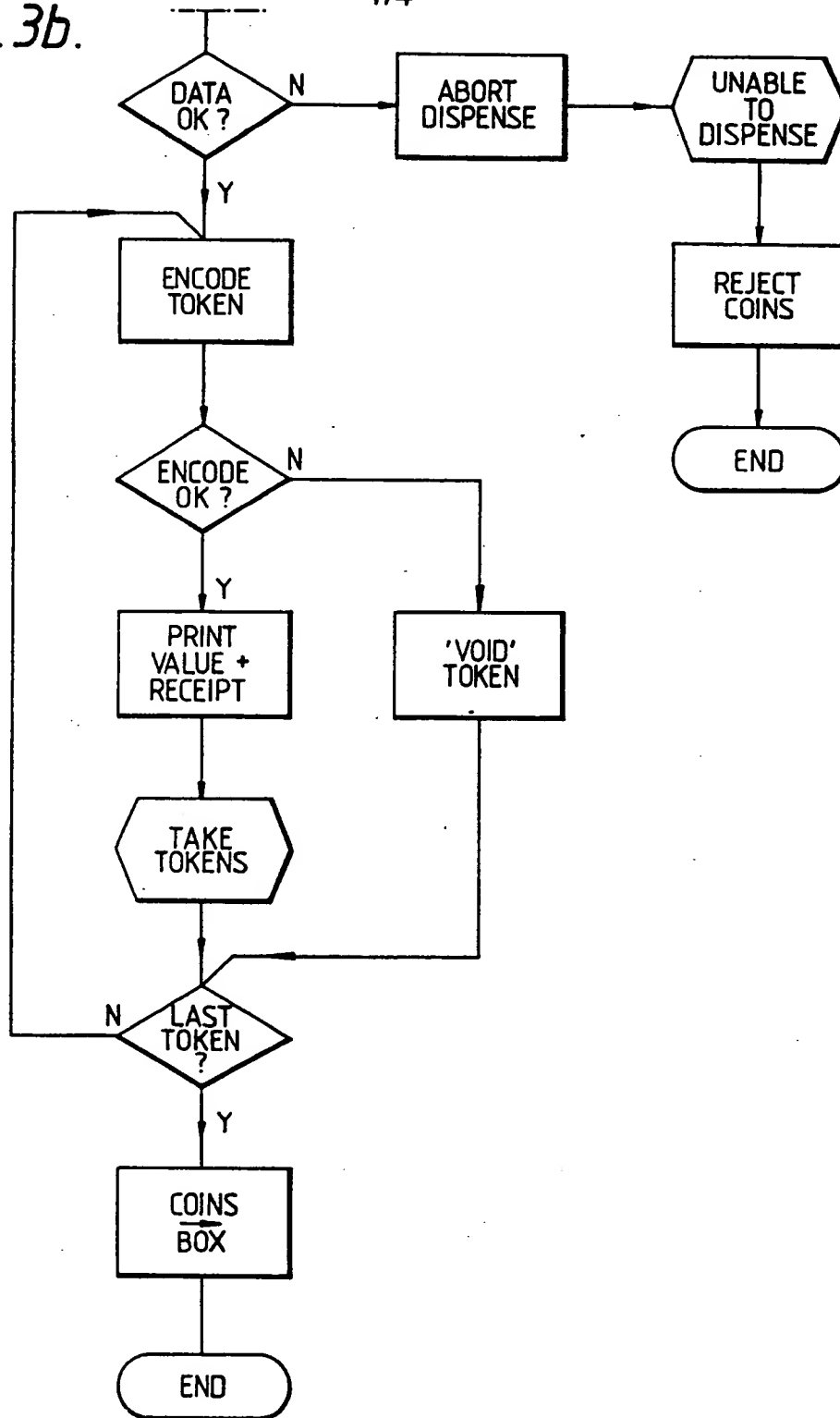TAKE CARD

STORE DATA (2 × MEMS)

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Fig.3b.

SPECIFICATION

Sheet dispenser

5 The invention relates to a sheet dispenser for
dispensing sheets carrying information to ena-
ble a commodity to be dispensed.
One method for purchasing commodities
such as electricity and gas is to provide a
10 meter at the consumer's location in which the
consumer inserts money in the form of coins
or the like as a prepayment for the com-
modity. Various problems arise with this type
of system since there is no record of the
15 amount of money inserted except the content
of the meter itself and there is the danger of
the meters being tampered with to extract the
money illegally.
In accordance with the present invention, a
20 sheet dispenser for dispensing sheets carrying
information to enable a commodity to be dis-
pensed comprises a money receiver for receiv-
ing a quantity of money from an operator and
for generating a signal representing the quan-
25 tity of money received; a control system re-
sponsive to operator instructions and the sig-
nal from the money receiver to cause one or
more sheets to be dispensed, each sheet car-
rying information relating to the quantity of
30 money received; and two stores for storing
the same transaction information, the stores
being separably accessible by processing
means whereby the stored information may be
read by the processing means.
35 The invention deals with the problems men-
tioned above by providing a sheet dispenser
which may be sited at a central location such
as a property owned by the commodity sup-
plier from which an operator may obtain
40 sheets to various values for subsequent use in
dispensing the commodity. Conveniently,
where the commodity is metred commodity
such as electricity or gas, the sheets are in
the form of tokens which can be inserted into
45 a meter in the form of a prepayment.
The use of two stores in the sheet dispen-
ser is important in order to provide security
against the information in one of the stores
being corrupted. The information from the
50 stores can be used to credit the operator's
account and clearly it is essential that this in-
formation is correct.
Preferably, a first one of the stores is pri-
marily accessible by the processing means
55 and the second one of the stores is larger
than the first whereby the second store is
adapted to store the information in the first
store and at least some of the information
most recently deleted from the first store. In
60 this way, additional security is achieved. Typi-
cally, the information will normally be read
from the first store but if it should appear that
this is incorrect, after that information has
been cancelled from the first store, the sec-
65 ond store can be accessed since that informa-

tion will still be present in that store.
Preferably, the sheets carry magnetic record-
ing means, such as magnetic stripes, the con-
trol system including a magnetic recorder for
70 recording on the magnetic recording means
transaction information such as the value of
the commodity which has been bought. This
is advantageous since the dispensing meter
can include a simple magnetic reading head to
75 determine the value of the token.
An alternative arrangement would be to re-
cord the value information in visible form but
this would require more complex optical sys-
tems for reading the information. Conveniently,
80 however, the control system also includes a
printer for printing on the sheet transaction
information such as the value of the com-
modity purchased the operator's identity and
the like.
85 The stores should preferably be non-volatile,
conveniently random access memories.
The transaction information preferably com-
prises at least a representation of the opera-
tor's identity and the amount of money repre-
90 sented by the dispensed token(s).
The control system preferably includes a
magnetic stripe reader for reading information
off a magnetic stripe on an identification card.
Alternatively, the system could include a key-
95 pad or the like for inputting information.
Typically, the money receiver will comprise
a coin acceptor which may be of any conven-
tional type.
In order that the invention may be better
100 understood, a preferred embodiment will now
be described with reference to the accom-
panying drawings, in which:
Figure 1 is a perspective view of the dis-
penser;
105 Figure 2 is a block diagram of the compo-
nents of the dispenser; and
Figure 3 is a simplified flow diagram illus-
trating operation of the dispenser.
The dispenser comprises a housing 1 with a
110 front panel 2 including an identification (ID)
card slot 3, a coin receiving slot 4, and keys
5, 6. A coin reject slot 7 is provided in a
lower portion of the panel 2 together with a
token dispense slot 8.
115 The components making up the token dis-
penser are illustrated in block diagram form in
Figure 2. These include an ID card reader 9
associated with the slot 3, a coin acceptor 10
associated with the slots 4, 7, and token dis-
120 pense units 11. The token dispense units in-
clude respective stores for storing rolls of un-
used tokens of different types which may be
preprinted with "standard" information relating
to the supplier of the commodity and the like,
125 and printers for printing additional information
on the token in accordance with the value of
the commodity represented by the token. As
indicated by dashed lines, the dispenser could
be adapted to accept bank notes as well as
130 coins.

The dispenser also includes a main non-volatile memory of for example the EEPROM type 12 and a secondary non-volatile memory of the EEPROM type 13 both linked with the
5 token dispense units 11. Overall control is provided by a controller 14 linked to all the components described.

Operation of the dispenser will now be described with reference to the flow diagram
10 shown in Figure 3. Each consumer is provided with his own ID card which includes a magnetic stripe into which is encoded his consumer number and the token type. The consumer number will be a unique number associ-
15 ated with that consumer while the token type relates to the use to which the token is put since, in the case of prepayment meters, there may be more than one meter type with each meter type requiring a different form of token.
20 The card reader 9 then reads the information on the ID card and if the card is not satisfactory, for example the card relates to a different commodity supplier, the card is returned through the slot 3 to the operator. If,
25 however, the card is accepted, the operator then inserts into the slot 4 the required number of coins for the value of the token which he wishes to receive. The coins are examined by the coin acceptor 10 and if they are not
30 accepted, the coins will be returned in a reject slot 7. If the coins are accepted, the operator is given the option of cancelling the transaction and if he accepts that option by pressing one of the keys 5, 6, the coins will be re-
35 jected and his ID card will be returned through the slot 3. If the operator instructs the transaction to proceed by pressing the other of the keys 5, 6, ("Tokens") his ID card will be returned after the information stored in the
40 magnetic stripe on the card has been stored in each of the two memories 12, 13. The value of the token or tokens to be dispensed will also be stored in each of the memories 12, 13.
45 The controller 14 then checks that the stored data is correct by comparing the stored data with the information read by the card reader 9 and determined by the coin acceptor 10. If the information is not the same
50 the transaction will be aborted and the ID card returned to the user. In addition the coins will be rejected.

If the information stored is verified, one of the token dispense units 11 will be activated
55 in accordance with the meter type read from the ID card and the leading token(s), in a roll will be encoded by the unit. If a fault arises during this encode operation, the token or tokens will be overprinted with the word
60 "Void". If the encode operation is successful, the value encoded will also be printed on the token(s) which acts as a receipt and the token or tokens are then dispensed through the outlet 8. The coins then pass from an Escrow
65 position into a secure coin box.

The controller 14 additionally checks that there are still spare tokens in each roll and, if a roll has run out, the dispenser will display a suitable indication.
70 The information in the main memory 12 can be downloaded via the controller 14 by connecting a remote computer with a data collection port 15 of the controller 14. Alternatively, the main memory 12 may be demountable
75 and after a suitable period such as one or two days, the memory 12 will be demounted from the dispenser and coupled with the remote computer to enable the data stored to be downloaded and deleted from the memory.
80 This data can then be used to credit the consumer,s account, print a list of transactions and the like.

If it is found that the data read from the main memory 12 has been corrupted, a back-
85 up is provided by the second memory 13 which has a larger memory size than the main memory 12 so that it holds not only the most recent information as stored in the main memory 12, but also information which has been
90 recently deleted from the main memory. For example, if the main memory is capable of storing up to two days transactions the secondary memory 13 may be capable of storing up to 4 days worth of transactions. To obtain
95 the information from the secondary memory 13, the remote computer is again connected to the data collection port 15 but addresses the second memory 13. In this way, a considerable increase in security of the recorded
100 information is achieved.

In some cases, it may be desirable to provide a logging printer (not shown) connected to an auxilliary serial port 16 to provide a hard copy receipt for each token which is issued.
105 This receipt will carry various transaction data including the consumer number, transaction value and the like and provides an alternative to using the token itself as a receipt.

Further an auxilliary serial port 17 may be
110 provided to enable an engineer to interrogate the controller 14 to enable on-line fault diagnosis to be achieved.

The controller 14 will be powered in a conventional manner and be provided with a bat-
115 tery back-up unit.

Connection with the remote computer may be achieved by any conventional connection system such as the public switched telephone network, leased lines, or packet switch stream
120 networks.

Typically the dispenser will be one of several at different locations serviced by a common central computer. The computer may be connected to each dispenser or the main
125 memories of each dispenser may be taken to the central computer for reading.

CLAIMS
1. A sheet dispenser for dispensing sheets
130 carrying information to enable a commodity to

be dispensed, the dispenser comprising a
money receiver for receiving a quantity of
money from an operator and for generating a
signal representing the quantity of money re-
5 ceived; a control system responsive to opera-
tor instructions and the signal from the money
receiver to cause one or more sheets to be
dispensed, each sheet carrying information re-
lating to the quantity of money received; and
10 two stores for recording the same transaction
information, the stores being separably acces-
sible by processing means whereby the stored
information may be read by the processing
means.
15   2. A dispenser according to claim 1,
wherein a first one of the stores is primarily
accessible by the processing means and the
second one of the stores is larger than the
first whereby the second store is adapted to
20 store the information in the first store and at
least some of the information most recently
deleted from the first store.
     3. A dispenser according to claim 2,
wherein the first store is demountable.
25   4. A dispenser according to any of claims 1
to 3, wherein the control system comprises
magnetic recording means for recording, on a
magnetic stripe of a sheet, information relating
to the value of the sheet.
30   5. A sheet dispenser substantially as herein
before described with reference to the accom-
panying drawings.
     6. A system for dispensing sheets carrying
information to enable a commodity to be dis-
35 pensed, the system comprising a number of
sheet dispensers according to any of the pre-
ceding claims; and a common monitoring sys-
tem including a computer for reading informa-
tion in the stores of each dispenser and for
40 recording the information in a central store.